Keywoong Bae

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HIGHLIGHTS

I will receive my **M.S. degree from Pohang University of Science and Technology (POSTECH)** in August 2025, and I will begin my mandatory military service in South Korea as a Data Analyst from September 2025. I am passionate about understanding phenomena through **data-driven analysis**, particularly within the **financial domain**.

During my graduate studies, my research focused on the field of **insurance**, with an emphasis on how the properties of cyber risk (e.g., ransomware) can impact an insurance regulatory model, such as Solvency II. My academic interests span the entire financial sector, including insurance, investment, and banking.

During my undergraduate and graduate education, I have utilized a wide range of data analysis methodologies, from traditional statistical approaches to state-of-the-art AI techniques. With these approaches, I'm eager to interpret financial phenomena from two viewpoints: **(i) engineering viewpoint** for enhancing analytical performance and **(ii) economic perspective** for deriving realistic implications. With this background and research interest, I aspire to make meaningful contributions to the field.

RESEARCH INTERESTS

Financial Domain; Data Science; Statistical Modeling; Generative AI; Deep Learning.

EXPERIENCE

- **Sixty Hertz**   Seoul, South Korea

  Data Scientist   *Jul. 2025 - __Current__*
  - Performing **anomaly detection** using predictions of renewable energy yield from a **VPP**(Virtual Power Plant).
  - **Skill used:** Python, SQL.
  - **Communication Tool:** Slack / Jira, Confluence.

- **AIRM Lab., POSTECH**   Pohang, South Korea

  Graduate Researcher (Advisor: Kwangmin Jung)   *Sep. 2023 - Jul. 2025*
  - Conducted scenario-based analyses on how **systemic cyber risk** affects **insurance regulatory models**.
  - **Teaching Assistant (TA):** Financial Accounting (IMEN203), Spring 2024; Spring 2025.
  - **Skill used:** Python, R.
  - **Communication Tool:** Slack.

- **Informatics and Deep Learning Lab., Inha Univ.**   Incheon, South Korea

  Research Intern (Advisor: Wookey Lee)   *Apr. 2021 - Jun. 2023*
  - Analyzed performance degradation in **Deep Learning** (e.g., Multi-modal and Diffusion generative models) under **adversarial attacks** on input distributions.
  - **Skill used:** Python / Keras, TensorFlow.

- **SL Solution Co. Ltd.**   Seoul, South Korea

  Internship course at Software Team   *Aug. 2020*
  - Developed a **responsive web application** visualizing COVID-19 patient movement paths on interactive maps by integrating public datasets with **geocoding** through the **Tmap REST API**.
  - **Skill used:** Java, Javascript / SpringBoot.

- **UDMTEK Co. Ltd.**   Suwon, South Korea

  Internship course at MES Team   *Dec. 2019 – Feb. 2020*
  - Managed database on **MES**(Manufacturing Execution System) and developed a **MVC**(Model, View, and Controller) service for maintenance.
  - **Skill used:** Java, TypeScript / Angular, SpringBoot.

- **POSTECH**   Pohang, South Korea

  M.S. in Dept. of Industrial and Management Engineering   *Sep. 2023 - Aug. 2025*

  ○ Industrial AI program

  ○ **Thesis Title:** Systemic Cyber Risks and Insurance Regulatory Capital.

- **Inha University**   Incheon, South Korea

  B.S. in Dept. of Industrial Engineering   *Mar. 2019 - Aug. 2023*

PUBLICATIONS

A. Working Papers

[1] **Bae, K.**, Jung, K., and Zhang, L. (2025). Systemic cyber risks and insurance regulatory capital. Working Paper.

B. International Conferences

[1] **Bae, K.**, Jung, K., and Zhang, L. (2025, Aug.). Systemic Cyber Risks and Insurance Regulatory Capital. *In the 5th World Risk and Insurance Economics Congress (**WRIEC**).*

[2] **Bae, K.**, Lee, S., and Lee, W. (2023, Dec.). Diffusion-C: Unveiling the Generative Challenges of Diffusion Models through Corrupted Data. *In the 37th Annual Conference on Neural Information Processing Systems (**NeurIPS**), Workshop on Diffusion Models.*

[3] **Bae, K.**, Lee, S., and Lee, W. (2022, Jul.). Bimodal Classification with CNN and Sequence Models. *In the 18th Int. Conference on Data Science (**ICDATA**).*

[4] **Bae, K.**, Lee, S., and Lee, W. (2022, Jan.). Transformer Networks for Trajectory Classification. *In the 2022 IEEE International Conference on Big Data and Smart Computing (**BigComp**).*

C. Domestic Journals

[1] Jung, K. and **Bae, K.** (2025). A Classification and Statistical Analysis on Systemic Cyber Risks. *Korean Journal of Insurance (**KJI**)*, 142, p.1-34.

D. Domestic Conferences

[1] **Bae, K.**, Jung, K., Zhang, L. (2025, Aug.). Systemic cyber risks and insurance regulatory capital. *In the Korean Insurance Academic Society (**KIAS**).*

[2] Jung, K. and **Bae, K.** (2025, Feb.). A Classification and Statistical Analysis on Systemic Cyber Risks. *In the 3rd Social Science Korea (**SSK**) Networking Symposium.*

[3] Jung, K. and **Bae, K.** (2025, Feb.). A Classification and Statistical Analysis on Systemic Cyber Risks. *In the Korean Insurance Academic Society (**KIAS**).*

[4] **Bae, K.**, Lee, S., and Lee, W. (2022, Dec.). Robustness Analysis of Diffusion Generation model Using Noises and Corruptions. *In the Korean Software Congress (**KSC**).*

[5] **Bae, K.**, Lee, S., and Lee, W. (2022, Jul.). Robust Multimodal Classification Model Using Homogeneous Features. *In the Korean Computer Congress (**KCC**).*

Projects

- **Assessment of the Corporate Customer Service and Proposal for the Improvement.**

  Korean Fire Protection Association (KFPA) *Sep. 2024 - Nov. 2024*
  - **Keywords:** Optimization, Linear Programming.
  - Analyzed the attributes of KFPA inspection staff based on employment types (Subsidiary, Contract worker, Outsourcing) and proposed workforce management strategies for enhancing inspection efficiency.
  - Optimized the number of personnel for building inspections using Linear Programming.

- **Data-driven Evaluation for Safety Assessment of the KFPA and its Future Strategy.**

  Korean Fire Protection Association (KFPA) *Apr. 2024 - Jul. 2024*
  - **Keywords:** Indexing, Random Forest, XAI.
  - Conducted data-driven analysis to estimate the efficiency of digital transformation strategies in building inspections.
  - Utilized a machine learning algorithm, such as random forest, to examine the impact of building features on inspection time and employed eXplainable AI (XAI) techniques for ensuring the interpretability of the results.

- **Responsive Web Application Development.**

  SL Solution *Aug. 2020*
  - **Keywords:** REST API, Geocoding, Responsive web service.
  - Developed a responsive web application to store and visualize the location data of COVID-19 confirmed cases. [Github]
  - Used the web development tools, including Spring Boot, MariaDB, and T-Map API.

- **MES Web Application Maintenance Project.**

  UDMTEK *Dec. 2019 - Feb. 2020*
  - **Keywords:** MES service, Responsive web service.
  - Developed a web application for Manufacturing Execution System (MES) services.
  - Implemented the MVC pattern using web development frameworks (e.g., Angular, Spring Boot, and PostgreSQL).

Skills

- **Language:** Korean (Native), English (Advanced).

- **Programming:** Python, R, C++ (Advanced), Java, JavaScript, SQL (Intermediate).

- **AI Framework:** TensorFlow, PyTorch, Scikit-Learn (Advanced).